

★ Do not need to

simplify/reduce final
answers on Test

Chapter 7 Review

KEY

Problem 1: The blood types of 415 people are collected at a doctor's office. The table shows the breakdown of patients per blood type.

Blood Type	Number of Patients
A	125
B	115
O	130
AB	45
Total	415

- a) If a person from this group is selected at random, what is the probability that this person has type O blood?

$$P(\text{Blood O}) = \frac{130}{415}$$

- b) How many people are in the complement of AB?

$$415 - 45 = 125 + 115 + 130 = 370$$

Problem 2: A box of silverware contains 13 forks (F), 15 spoons (S) and 8 knives (K). 36 total

- a) If you reach in and randomly grab one item, find the probability it is either fork or knife.

$$P(F \text{ or } K) = \frac{13 + 8}{36} = \frac{21}{36} \rightarrow \text{Mutually Exclusive}$$

- b) If you randomly grab two items in succession without replacement, find the probability you get a spoon and then a knife.

$$P(S \text{ then } K) = \frac{15}{36} \times \frac{8}{35} = \frac{120}{1260}$$

- c) Suppose you randomly grab one item, replace it, and grab another. Find the probability you get a two spoons.

$$P(2 \text{ spoons}) = \frac{15}{36} \times \frac{15}{36} = \frac{225}{1296}$$

Problem 3: 8 junior high classes will be chosen to participate in a school improvement survey. There are 21 junior high classes in the school. In how many ways can the classes be chosen?

order doesn't matter $\Rightarrow nCr$

$$21C8 = 203,490 \text{ ways}$$

Problem 4: Suppose that 5% of the time Todd goes to the movies twice a week, 15% of the time he goes to the movies once a week, and 80% of the time he doesn't go to the movies at all in a given week.

- a) What is the expected value for the number of times Todd goes to the movies during a week?

x	$P(x)$
2	0.05
1	0.15
0	0.8

$$E(x) = 2(0.05) + 1(0.15) + 0(0.8)$$

$$\downarrow = 0.25 \text{ times per week}$$

- b) What is the expected value for the number of times Todd goes to the movies in 3 weeks?

$$E(\text{\# times in 3 weeks}) = 3 E(x) \quad \rightarrow \text{one week}$$

$$\downarrow = 3(0.25)$$

$$= 0.75$$

Problem 5: An experiment is performed where a 3-color spinner is spun and then a 3-sided die is rolled. The possible outcomes for the spinner are red (R), blue (B), and yellow (Y) and for roll of the die are {1, 2, 3}. Identify the sample space for this experiment.

$$S = \left\{ \begin{array}{lll} 1R & 2R & 3R \\ 1B & 2B & 3B \\ 1Y & 2Y & 3Y \end{array} \right\}$$

$$\text{check} \rightarrow \frac{3}{\text{colors}} \times \frac{3}{\text{dice}} = 9 \text{ total outcomes}$$

Problem 6: Passwords for your iPhone require 6 characters. If the first three must be digits 0-9 and the last three must be lowercase letters a-z, how many different passwords can you make? *with replacement*

$$\frac{10}{\#} \times \frac{10}{\#} \times \frac{10}{\#} \times \frac{26}{\text{letter}} \times \frac{26}{\text{letter}} \times \frac{26}{\text{letter}} = 10^3 \times 26^3 \text{ total passwords}$$

Problem 7: A high school is forming a new club. The students interested in the club include: 5 freshman, 9 sophomores, 7 juniors and 8 seniors. If 4 students are to be selected to join the club, find the probability all four are sophomores.

Direct

$$\frac{9}{29} \times \frac{8}{28} \times \frac{7}{27} \times \frac{6}{26} = \frac{3024}{520024} = \frac{2}{377} \quad \text{29 Total}$$

Soph Soph Soph Soph

Counting

$$\frac{{}_9 C_4 \text{ sophomores ONLY}}{{}_{29} C_4 \text{ ALL}} = \frac{126}{23751} = \frac{2}{377}$$

order doesn't matter \Rightarrow nCr

Problem 8: Enrollment data for a large lecture class is shown in the table below.

	Male	Female	Total
Freshman	19	13	32
Sophomore	14	16	30
Junior	11	14	25
Senior	18	7	25
Total	62	50	112

- a) Find the probability a randomly selected student is a Male.

$$P(\text{Male}) = \frac{62}{112}$$

- b) Find the probability a randomly selected student is a Junior.

$$P(\text{Junior}) = \frac{25}{112}$$

- c) Find the probability a randomly selected student is a Female and a Senior.

$$P(\text{Female} + \text{Senior}) = \frac{7}{112}$$

- d) Find the probability a randomly selected student is a Male and a Junior.

$$P(\text{Male} + \text{Junior}) = \frac{11}{112}$$

- e) Find the probability a randomly selected student Female or a Junior.

$$P(\text{Female OR Junior}) = \frac{50 + 25 - 14}{112} = \frac{61}{112}$$

- f) Find the probability a randomly selected student Freshman or a Male.

$$P(\text{Freshman OR Male}) = \frac{32 + 62 - 19}{112} = \frac{75}{112}$$

- g) Find the probability a randomly selected student a Female given they are a Freshman. *additional info*

$$P(\text{Female} | \text{Freshman}) = \frac{13}{32}$$

- h) Find the probability a randomly selected student is a Senior given they are Male. *already know male*

$$P(\text{Senior} | \text{Male}) = \frac{18}{62}$$

Problem 9: Suppose the probability of a dog winning a ribbon at the dog show is 0.75.

- a) What are the odds of winning? Express your answer in the form a:b.

$$\text{odds}_{\text{win}} = \frac{P(\text{win})}{P(\text{lose})} = \frac{0.75}{0.25} = \frac{3/4}{1/4} = \frac{3}{1} \rightarrow 3:1$$

- b) What are the odds of losing? Express your answer in the form a:b.

$$\text{odds}_{\text{lose}} = \frac{P(\text{lose})}{P(\text{win})} = \frac{0.25}{0.75} = \frac{1/4}{3/4} = \frac{1}{3} \rightarrow 1:3$$

or just flip

Problem 10: There are 22 students in a kindergarten class. If each kindergartner can have only one task, in how many ways can the teacher assign out the following tasks: line leader, wipe down the tables, pass out papers, water the plants?

line leader tables papers plants

"Slots" (positions) have meaning \Rightarrow order matters
nPr

$$22 P_4 = 17,8560 \quad \text{total ways}$$